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APPLIED SCIENCES

VISIT TO ATOMIC ENERGY INSTITUTE DESCRIBED

Beijing BELJING WANBAO in Chinese 10 Aug 80 p 2

[Article by Guo Jian [6753 0265] and Shuang Yin [7175 0603]: "A Visit to the Institute of Atomic Energy"]

[Text] When the news came that we were going to visit the Institute of Atomic Energy, everyone was very excited because atomic energy is so unfamiliar and mysterious to us. As soon as our car left the city of Beijing, it dashed toward the southwest. After we passed Liangxiang town in Fangshan County, from time to time we could see quite a far distance away a group of red buildings behind a forest of green trees. There it was, the Atomic City, a place we were so anxious to see.

The institute is about 50 kilometers from Beijing. It is situated in front of Yan Shan and is a neighbor of the Petroleum City--Yanshan Petrochemical Company. Since the ground-breaking in 1956, it has developed into a small town of 13,000 persons and has since been named Xin Zhen [New Town] of Fangshan County. We were, therefore, not exaggerating when we referred to it as the Atomic City.

Our car passed through the residential area and, following the directing arrow signs, turned into the plaza of the institute. The first to welcome us was the big, tall reactor cooling tower, majestically and solemnly telling us that "Now you are in Atomic City!"

Receiving a group of laymen like us, the hosts were bound to spend more breath. After they conducted an educational initiation on atomic energy for us, the host said: "People are always afraid of radiation the moment they hear the mention of atomic energy. Actually, radiation is like a tiger--it may eat people when it is in the mountains but it is for us to watch when placed in the zoo." What an esoteric and penetrating analogy!

According to Wang Ganchang [3768 3227 2490], the 73-year-old director, the Institute of Atomic Energy is a multi-disciplinary research institute engaged in the basic and applied research of nuclear physics, radiation chemistry and atomic reactors. In addition, the institute also develops and produces radioactive and stable isotopes. The enthusiastic host first led us to see the reactor.

From the outside, the reactor building looks like an ordinary 4-story building. But when we got to the third floor and went through a big gate, a brightly-lit big hall appeared before our eyes. The atomic reactor, a cylindrical object more than 9 meters in height, stood at the center of the hall. On top of the scaffolding around the reactor, people were busy working. Overhead cranes were moving back and forth. Even on top of the reactor, there were a few people working. It turned out that the reactor crew was preparing the reactor for a physical start-up after they had completely overhauled the reactor active area according to the directives of "improve, make use of the potential and reform."

Reactor Chief Engineer Ma Fubang [7456 4395 6721] told us that the full name of the reactor was "Research Heavy-Water Reactor." It was introduced from Russia and its operation began on 27 September 1958. At that time, the pick-up mechanism of radioactive targets at the vertical port of the reactor was very crude--something like the tackle (Chinese windlass) used for farm wells in China--and the reactor must be shut down when targets were being placed or picked up. Hence, the reactor was able to irradiate only small quantities of experimental radioactive isotopes. Also, there were no experimental set-ups in the horizontal port channel. So the Chinese scientists decided to modify the reactor so that its utility can be extended. After repeated exploration, they devised an electric vacuum grab hook which can automatically change targets by using a cantilever overhead crane operated remotely without the need to shut down the reactor. Television monitoring was also used. These changes have greatly enhanced the usefulness of the reactor and the radioactive isotopes produced by the reactor have served provinces and municipalities all over China, except Taiwan and Tibet. Experimental facilities were also set up in the horizontal port channel for various types of research work. When the reactor was brought in, its rated power was 7,000 kilowatts and its reinforced power for short time duration was 10,000 kilowatts. After a series of improvement measures, the reactor operated at 10,000 kilowatts output for quite some time and thus made its contribution to the development of atomic energy in China.

Ever since the reactor started operation, it has had 20 years of safe running, thanks to the careful maintenance and the continuous improvements made by the workers. In 1978 the reactor reached its life limit. Inner shell active area container developed small leaks, the leak flow rate at the service pipe socket increased and other facilities also suffered damage to various degrees. On 8 November it finally stopped operation. Under such circumstances, what should we do? Should we just close the reactor permanently and "retire" it? Or, should we try to rebuild it somehow? Large-scale rebuilding projects of this kind are rare even in foreign countries because of the great difficulties involved and the risks one has to take. But the institute decisively chose to go ahead with the rebuilding.

The biggest technical hurdle in the rebuilding was the handling of the inner shell active area container which, after 20 years of use, has become a "strong radioactive source." People must stay far away from it to prevent radiation hazard. Any hoisting operation must be done through remote control and performed safely and cautiously since the results otherwise would be

unthinkable. In Canada, the handling of this type of facility is done by transporting it to an unpopulated area on a trailer. The Chinese scientists and workers, however, chose to use a permanent on-the-spot storage method instead, that is, to bury the entire inner shell deep in the ground right beside the reactor. The entire operation was carried out by using long distance remote control and full use was made of the existing hoisting machinery and field facilities. Its procedures are more convenient to carry out, it had a better reliability and it cost less. With a closely coordinated effort of the technicians and workers, the hoisting and burial of the "strong radioactive source" succeeded in the first trial.

We were told, in front of the reactor control panel, by Chief Engineer Ma that the big reactor overhaul project ended on 27 June of this year and the reactor has now entered its physical start-up and its engineering start-up stages. Operation at large output power will follow and there will be a certain amount of increase in the rated power of the rebuilt reactor.

9698

CSO: 4008

APPLIED SCIENCES

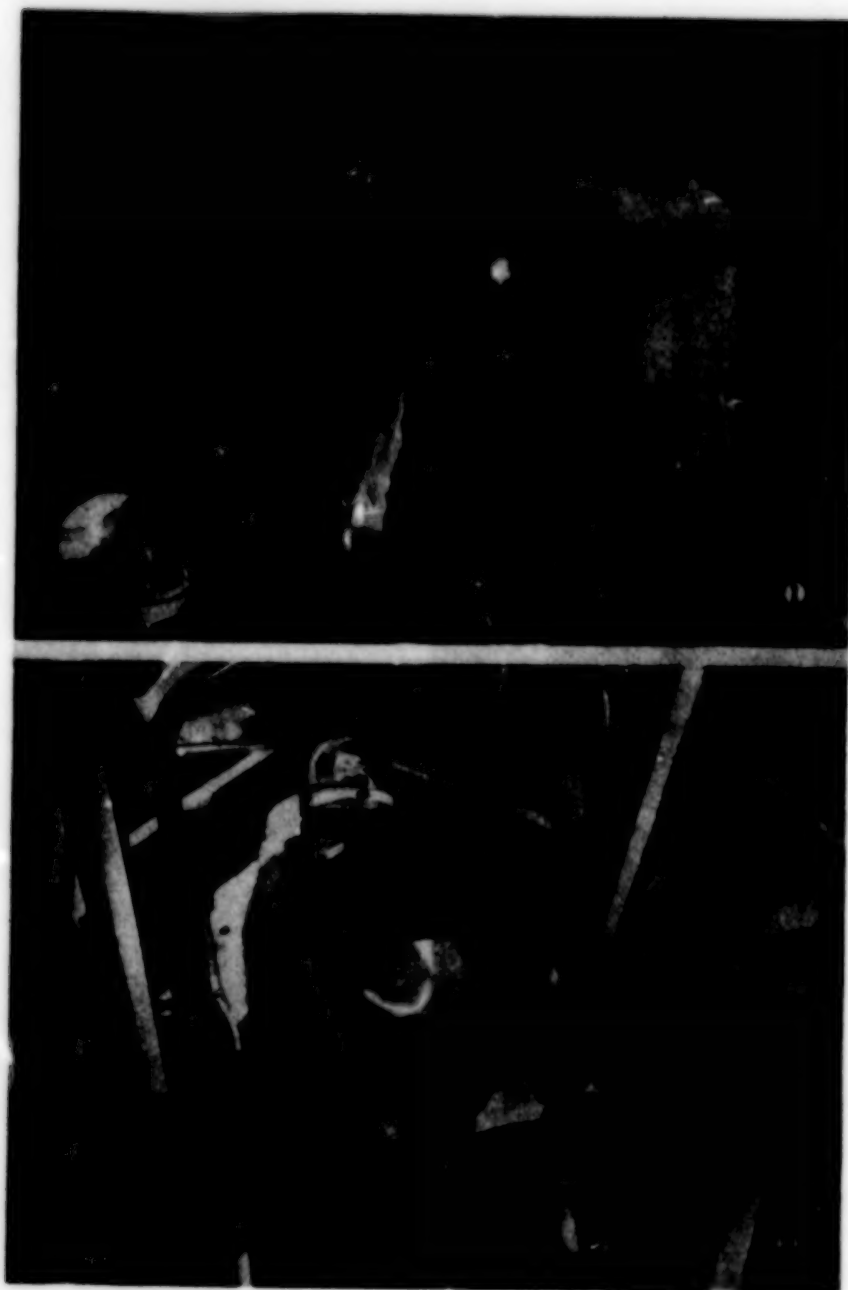
ASTRONAUT TRAINING ACTIVITIES ILLUSTRATED

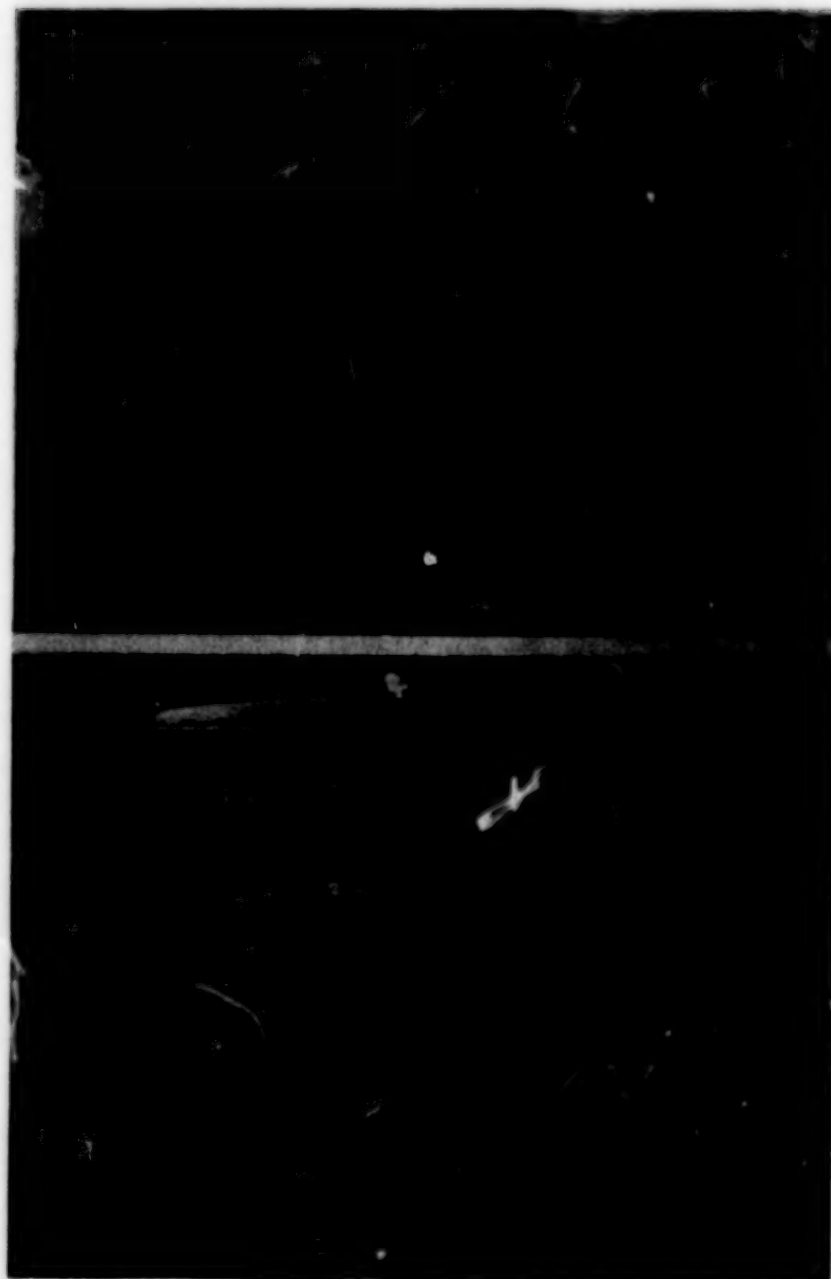
Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 4, Apr 80
centerfold

[Article: "The March Towards Space"]

[Text] The photographs shown on these pages are selected scenes from an educational film entitled "Marching Towards Space," which is being produced by the Shanghai Scientific Educational Film Factory. These particular scenes illustrate the training activities of astronauts. Other parts of the film also illustrate other interesting facts about modern space technology such as carrier rockets, artificial satellites and space ships.

The contents of the pictures are as follows: 1) Astronaut trainee trying on a space suit, which is a special clothing designed to ensure the safety of astronauts in space. 2) Astronaut trainee getting ready to enter a centrifuge for g-load test. The centrifuge has a long steel arm with a seat attached to it; when the centrifuge begins to rotate at high speed, the astronaut will be subject to large centrifugal force equivalent to the g-load condition experienced during a rocket launch. 3) Astronaut trainee undergoing impact test. During the test, the astronaut lies in a foam-rubber chair which is dropped from a height of 20 meters of the impact tower. This is to simulate the possible impact condition during the landing of a space ship. 4) Astronaut trainees observing the stars in the universe from a simulated spaceship cabin. 5) Astronaut trainee in space suit being tested in the spaceship simulator. 6) Three astronaut trainees tasting the specially prepared "space food."







3012
CSO: 4008

APPLIED SCIENCES

GENERAL PURPOSE GASEOUS RUST INHIBITOR DEVELOPED

Beijing BEIJING RIBAO in Chinese 12 Aug 80 p 2

[Article by Zhang Jiwu [1728 4480 2976]: "Report on Gaseous Rust Inhibitor Developed by Special Steel Technician Zhang Jiwu [1728 0679 0710]"]

[Text] Beijing Special Steel Mill technician Zhang Jiwu [1728 0679 0710] has successfully developed a general purpose gaseous rust inhibitor after tackling the difficult technical problem of rust prevention on steel wire solders with great perseverance.

In the past, oil has generally been used as a rust inhibitor on steel wire solders manufactured by various plants in China. If the oil layer is put on too thin, the solder wires will rust very quickly. When the oil layer is too thick, then, it cannot be easily washed off before use and it causes adverse effects in the quality of the solder joint and in the working conditions. At the beginning of last year, technicians Zhang Jiwu, working in the Technical Division of the mill, and Jia Anqing [6328 1344 1987] of the Steel Wire Shop jointly investigated this difficult problem. They went to the libraries and bookstores to search for technical information and, after more than one year's hard work on dozens of different test agents and mixing ratios and hundreds of experiments, they finally succeeded in producing a general purpose gaseous rust inhibitor. Steel wire solders treated with their rust inhibitor do not rust in a humid environment for more than 1 year. Tests conducted by the users indicated that the new rust inhibitor has good electrical conduction properties, maintains stable arcs and produces relatively little spattering and fume. The working conditions are, therefore, improved. Furthermore, stretching, bending and impact tests performed on the soldered pieces have shown that steel wires soldered with the new gaseous rust inhibitor are far superior to those treated with oil. This new product has made its contributions to the rust prevention technology for metallurgical products in China.

9698

CSO: 4008

SUCCESSFUL THERAPY IN COMPULSIVE NEUROSIS CASES REPORTED

Beijing ZHONGGUO SHENJING-JINGSHENKE ZAZHI [CHINESE JOURNAL OF NEUROLOGY AND PSYCHIATRY] in Chinese Vol 13, No 3, Sep 80 pp 161-165

[Article by Dong Jingwu [5516 4842 2976] and Li Xintian [2621 1800 3944], Institute of Psychology, Chinese Academy of Sciences; and Tian Zuan [3944 4371 1869] and Wen Chuanrun [3306 3123 3387], Beijing Anding Hospital: "Behavior Correction Therapy in Obsessive Compulsive Neurosis"]

[Text] 1. General Exposition of Obsessive Neurosis and Correction Therapy

Obsessive compulsive neurosis is a separate neurotic ailment in the category of neuroses which is manifested by a slight degree of functional nervous obstruction. By obsession is meant a compulsive nature or a compulsive quality that frequently includes some involuntary, irrational, unrealistic, and unnecessary recurring notions, ideas, fears, or impulses. By compulsion is meant a manifestation in the daily life of the patient of irrational and unnecessarily duplicative action, or habitual speech or other complex forms of behavior. Some literature notes six symptoms for obsession and two symptoms for compulsion.¹ These are discussed individually below:

1. Obsessions include: (1) obsessive doubt, not believing that one has successfully completed a task or a job; (2) obsessive thinking, a superficially endless thought cycle, frequently centering on some future event; (3) obsessive impulse, a powerful desire to commit some pointless act or to carry out some socially destructive or offensive action; (4) obsessive fear, a fear of losing self-control and constant apprehension about making mistakes; (5) obsessive image, maintaining in the brain a picture of some recently seen thing or event; (6) any other phenomenon of an obsessive character in addition to the five given above.

2. Compulsions include: (1) yielding compulsion, meaning a type of compulsive action that expresses some hidden desire; (2) controlling compulsion, in which compulsive action transfers the hidden compulsive idea. In other words, it means a new compulsive activity produced in order to control an old compulsive idea.

Ordinarily we are not this detailed in our distinctions, instead laying stress on the three principal symptoms of compulsive ideas, compulsive feelings, and compulsive actions. In some patients it is compulsive ideas that are dominant; in others, it is actions. But when actual flareups occur, the three are frequently related, with the compulsive ideas and compulsive feelings happening first, followed by an outbreak of compulsive actions.

The obsessive compulsive patient is quite aware that his compulsive ideas, feelings, and actions are absurd and unnecessary, and he consciously attempts to control them, but frequently matters go contrary to his wishes, and the patient cannot help continuing to think, or continuing to be stimulated, or continuing to act. Unless he continues to think or act, he is not comfortable and becomes more frustrated. As the neurosis advances, the patient discovers an ever-increasing weakening of his will to control and his ability to regulate his own ideational activity or actions, and he then realizes that he is ill and voluntarily seeks treatment.

The incidence of occurrence of obsessive compulsive neurosis in the general population is about 0.05-1 percent, but among patients with neurotic disorder the incidence of obsessive neurosis is quite high, possibly 1 to 2 percent. It occurs with equal frequency in males and females. It usually occurs before the age of 20, and the oldest child or an only child is prone to it. People with higher cultural levels or intelligence who are inclined toward abstract thought are prone. Many people who have obsessive qualities or symptoms do not necessarily become obsessive compulsive neurotics, so the relationship between personality and abnormality is not definitive.

The pathogenesis of obsessive neurosis is explained in various ways:

(1) The Freudian psychoanalytical school believes that obsessive neurosis results from psychological conflicts of a special nature and psychological repression. Compulsive behavior is a reaction that comes about subsequently, in an effort to conceal the tendencies that were repressed in the child in its early years. Compulsive behavior is a means of disguising self-reproach which originates during childhood.² (2) Classical behaviorists or learning theoreticians believe that obsessive neurosis results from an abnormality in the stimulation of the nervous system and inhibition of the nerve centers, and that an irregularly stimulated nervous system leads to an abnormal nervous relationship, which produces a persistently stagnant and inert focus of excitation--i.e., an isolated binding [4016 7820]. Compulsive "thought rumination" is most likely to occur among psychasthenics in whom the second signal system is dominant over the first signal system. The repeated cycle of stimulus and response gradually becomes a fixed behavior form or a learned habit. (3) Still another explanation is that compulsiveness arises out of conflicts in motivation and the frustration of emotions, with the conflicts and emotional frustrations arousing a high degree of anxiety within the sufferer, causing dejection and agitation. In order to rid himself of this anxiety and agitation, the sufferer frequently manifests a series of involuntary and irrational absurd behavioral acts under the control of his subconscious. Such repeated impulsive behavior increases rather than decreases, with resultant loss of control. Not only does the original agitation remain unresolved, but new tensions, fears, suspicions, and such obsessive symptoms are created. Looked at in terms of physiological processes, the thalamus is the main seat of emotional regulation, and the interbrain is the information transmission station between the sensory organs and the cerebral cortex. When a person's emotions are given a shock, it is this transmission station that receives a powerful stimulation, causing the entire cerebral cortex to produce dramatic mental overactivity. The programming of nervous activity goes out of control, going into a state of stimulation that cannot be consciously

controlled, or into a constantly tense emotional state. In 1936, W. B. Cannon was the one who earliest described this sort of emergency reaction, terming it "fight or flight," which is characterized by the increased formation of catecholic amine accompanied by a rise in blood pressure and more rapid heartbeat and breathing, as well as by a markedly increased flow of blood to the skeletal muscles. In tests conducted on the thalamus of animals, direct stimulation of the covering of the midbrain and the central gray matter was able to induce such emergency reactions.³

In summary, there are three principal explanations for the pathogenesis of obsessive compulsive neurosis: (1) early repression; (2) learned bad habit; and (3) emotional frustration.

There is as yet no therapy abroad that is considered to be effective for obsessive compulsive neurosis. Traditional therapeutic methods include medicinal treatment, electric spasms, brain surgery, psychological therapy, and changed environment, none of which is very effective. Recent therapeutic measures have increased behavior-correction therapy. We know that obsessive compulsive neurosis is a psychogenic ailment requiring use of comprehensive treatment methods, of which psychological therapy is the major one, and the use of behavior-correction therapy to deal with compulsive notions to obtain fairly satisfactory results.

Clinical application of learned tenets of behavioral-correction therapy has developed rapidly during the past 20 years as a result of scientific behavioral experiments. In clinical treatment centering on abnormal behavior of patients, either in real-life situations or devised situations, abnormal behavior has been eradicated. Through specially designed programs, normal behavioral habits have gradually been established. In essence, through conscious external correction, a gradual effect on internal functioning of individual behavior can be observed. Inasmuch as the patients' compulsive symptoms had already become bad habits which appeared and reappeared and were extremely persistent, only through the study of theory and a series of behavioral experimental methods was it possible to provide the patients with effective study of experiences, study of environments, and study of techniques. Biological feedback, system desensitization, and suppression therapy have derived from behavioral experiments with animals, while relaxation reaction therapy has derived principally from the summarization of study and practical experiments with man himself. In therapeutic practice, we have used biological feedback primarily on the heart rate, system desensitization, and static state relaxation reaction and dynamic yishou [1942 1343] training. Relaxation of the skeletal muscles as a result of slowed heart rate is an objective indicator signifying a trend toward calmness in the emotional state. We used an electronic heart rate meter for direct display of the effects of training on the patient. In the process of heart rate feedback training, each time the heart rate reading declined 5 to 10 points (the equivalent of one-tenth the original heart rate), a "success" signal was fed back to the patient. Patients gradually learned through the guidance of definite experience procedures how to regulate the direction of their own efforts (level of relaxation) on the basis of signals for success or failure. Once the heart rate had gradually declined to a suitable level, it was maintained there for about 20 minutes or so.

Our use of system desensitization was for the purpose of getting rid of compulsive obsessive behavior caused by strong feelings of dread. On the basis of the conditioned reflex principles combined with relaxation techniques, the patient, when in a relaxed state, was repeatedly subjected to increasingly greater unpleasant stimuli until he no longer reacted to, was insensitive to, suppressed, or got rid of the feelings.

Static relaxation reactions were aroused principally through the regulation of breathing, relaxation of skeletal muscles, and yishou. Static relaxation reactions are characterized by decreased activity of the body's entire sympathetic nervous system, with marked improvement in anxiety states. This kind of relaxation reaction was induced by Hess through stimulation of an area in the hypothalamus of a cat.

The purpose of dynamic yishou training is to gradually enlarge the effects of training in the patient's daily dynamic environment, so that when he is removed from the instruments, the patient can make every effort to reduce the frequency of occurrence of his compulsive ideas and activities; this is extremely important in the prevention of recurrences. Detailed reports are available about the use abroad of heart rate feedback to treat anxiety and dread neurosis,⁴ the use of relaxation reaction to treat anxiety neurosis,³ and the use of system desensitization and ideational interruption therapy to treat compulsive neurosis.⁵ All methods and principles are reported.⁶

In the course of the above-described corrective therapy, patients were led, through proper psychological therapy, to reveal early repressions and anxieties, and patients were helped to analyze the causes for their illness through an explanation of the principles underlying corrective therapy and through a formulation, in conjunction with the patient, of an agenda to set up new rules for living and to change old habits. Gradually, confidence in triumph over the ailment and determination were established. The goal of this series of psychological therapy is to increase the ability of the patient to understand and to establish in the patient a proper attitude about himself and about reality, so that he can overcome his own compulsive symptoms and take the initiative in carrying out all the measures involved in corrective therapy, with the patient himself playing the main role in the therapeutic process.

Effective methods and a proper attitude are the two keys.

Once therapy has been completed, regularly scheduled followup interviews should be maintained. These can fortify and increase the effectiveness of the therapy by supplying continued supportive guidance. They can also uncover new problems and summarize experiences.

II. Diagnosis and Treatment, and Their Results

Between mid-May and mid-September 1979, behavior-correction therapy experiments were conducted at Anding Hospital in Beijing.

Table 1. Course of Treatment and Specific Requirements

Method	Requirements		
	First Course of Treatment	Second Course of Treatment	Third Course of Treatment
Living highlights	Prescribed rest periods.	Gradually increased exercise topics.	Exercise methods become a habit.
Medication	Amount maintained.	Reduction in medication.	Halt to medication.
Psychological therapy	Analysis of pathogeny; correction of patient's understanding of himself, his ailment, and of reality. Encouragement to patient to rebuild confidence and to take the initiative. Point out patient's weaknesses and bad habits.	Analyze ailment for patient and give him an explanation of principles underlying behavior-correction therapy. Strengthen patient's motivation to prepare to change his habits and his personality. Permit patient to understand the meaning of training measures.	Revive or establish ideals and interests. Help resolve the practical difficulties in employment, love, marriage, and environment. Instruct in the meaning of measures to prevent recidivism.
Behavior training	Three times per week, abdominal breathing exercises, static relaxation exercises, heart-rate feedback exercises, and dynamic yishou exercises.	Six to 12 times per week, hearing feedback exercises; conduct of systematic desensitization of fears and compulsive actions; building of conditioned reflexes when removed from instruments.	Without keeping track of time or the number of times, and without being on the instruments, learning to do exercises alone, to make self-evaluation, to practice self-control, and to carry out dynamic yishou exercises to prevent recurrence.

Instrumentation. (1) Electronic pulse meter, Type DM-1 (produced by the Shanghai Hunan Electric Instrument Plant); (2) Heartrate reduction signal feedback box (self-made); (3) Breathing-cycle adjustment box (self-made).

Ambient conditions: Silence required in therapy room; light can be regulated with black curtains.

Patient selection: Patients who have been definitely diagnosed as having obsessive compulsive neurosis, and who had undergone the first course of treatment without a hitch.

Course of treatment and methods: For specifics, please see Table 1.

Objective indicators. When using heartrate feedback, numerical value for each reduction in heartrate (please see Table 2).

Table 2. Record of Decline in Heartrate During Heartrate Feedback Exercises

		Succession															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Heart-rate, Times per Minute	Before exercise	65	85	80	75	85	80	72	75	70	70	70	75	85	80	75	75
	After exercise	48	72	72	65	75	67	55	62	60	60	60	65	70	65	65	65
	Numerical value for	17	13	8	10	10	13	17	13	10	10	10	10	15	15	10	10
	reduction																

Conclusions: After three patients had undergone three courses of treatment in behavioral correction as outpatients, one was virtually completely cured, and the other two showed marked improvement (because of instrument outages, these two had few exercises).

III. Excerpts from the Medical Record

Case 1. Male, 29 years old. Junior middle school graduate. Single. After having obsessive fears for 14 years, patient came to hospital for diagnosis in March 1978. While walking along the street one day in 1965, a feeling of misery that was difficult to describe suddenly afflicted the patient, and from then on, whenever he went outdoors, his whole body felt tense; he feared meeting people; feared that others would see him, and whenever anyone did see him, his face became red. Consequently, he did not dare go to public places, and he did not dare go to stores to buy things. If he forced himself to go out on the street, his body would feel extreme discomfort, and he would feel very sad and would be in a tense state all day long. One year later, his symptoms intensified. He would be at a loss to know what to do about events that had happened; he felt he could not analyze problems; he became fond of working on inconsequential matters, and

he felt that his brain was different from that of others. Later on, this feeling of "unnaturalness" became increasingly severe and became a preoccupation. He felt that his own clothes would change color and that the skin on his hands would change color. After March 1968, he began to have insomnia, and as soon as any notion entered his mind, he would feel extreme discomfort and would have a pain in his heart. Upon meeting anyone or upon meeting his colleagues, he would become furious, and vent his anger to the point where he was not even able to eat with anybody. After 1969, he began becoming suspicious and anxious. He suspected someone was watching him and talking about him, as though people's every movement was directed against him. He worried about things in the past, and upon awakening from an afternoon nap, he would feel all of his pockets, fearful that something had been lost or was stolen. He himself realized that this was unnecessary, but he was unable to stop doing it. In 1973 he made friends with a woman, but gradually he lost interest in females and showed repression of feelings, but he also feared not being able to find a mate. He was often filled with anxiety, feeling that he had lost his hair and that others were luckier than he. Subsequently, he gradually realized that his symptoms were becoming more and more uncontrollable and that his illness was worsening. He wrote numerous letters to hospitals in Beijing, and he also read some medical books.

The patient had gone full term in gestation and had been born without complications. He was a middle-school graduate. In primary school, the patient had had scarlet fever. Neither his father, mother, nor brothers have had a similar history of illness. The patient had been timid and shy from an early age, and upon entering primary school he had a stuttering impediment, a lack of confidence, no definite ideas of his own, was indecisive, and lacked deep convictions in handling matters.

The patient's growth was good and he had no physical abnormalities. The patient had a lucid mental alertness, answered questions fluently, had self-knowledge, and normal sense of direction. He sought treatment urgently. On the basis of the patient's major symptoms, he had obsessive fear reactions, obsessive suspicion symptoms, and obsessive actions. The patient felt pained by many of his symptoms, but he was unable to get rid of them. The patient was able to criticize his obsessive symptoms. The obsessive symptoms appeared repeatedly and continued to exist. There was a definite scope to their main theme, and they had come to be the major ingredient in the patient's thinking, affecting both his work and his life. Before the patient had become ill, his temperament had manifested psychasthenia, for which reason he was diagnosed as being an obsessively fearful compulsive neurotic.

At the end of May 1979, the patient underwent behavior correction therapy. The patient said that for more than a year he had been taking xiaojianding [4285 1015 124- 153], Duoluping [1122 1982 1627], Jiannao [0256 5207] No 1, and tran-... , but none of these medicines had proven effective, so as soon as therapy began, he ceased taking all medicine. Between June and the middle of September, three courses of therapy had been completed. Each week, at least three outpatient psychological treatments and behavior exercises were taken. For a record of heartrate feedback numerical values in the course of the therapy, please see Table 2. On average, each exercise reduced the heartrate by more than

10 beats per minute. System desensitization of the patient consisted of three items: "unnatural feelings," "face-reddening fears," and "agoraphobia." Methods used followed conventional desensitizing procedures.⁶ The patient basically learned the static relaxation exercises and the static yishou exercise and was able to do the exercises by himself, away from the instruments.

Results of therapy and followup interviews. The patient is presently able to control harmful fear reactions; divest himself of feelings of pain, and get rid of "guilt" anxieties. He has no sense that his clothing or the color of the skin on his hands are changing color, and he is interested once again in having female friends. Now he can go openly to places where there are a lot of people and run or exercise in the street. The patient feels a lightheartedness such as he has not experienced in more than 10 years. All serious symptoms have been substantially overcome; he has been evaluated as being virtually entirely cured; and he has formally gone to work.

Case 2. Male, 28 years old. University graduate. Married. Because of obsessive notions and checking and rechecking behavior for a period of 12 years, he came to the hospital for diagnosis in November 1978. At the time of the Great Cultural Revolution, the patient had carelessly written a political slogan on a blackboard that caused others to misunderstand, and which was regarded by his classmates at the time as being a reactionary slogan, for which he was subjected to criticism and termed a reactionary student. Because of excessive mental tension and anxiety, he began to have headaches, his memory deteriorated; he had difficulty understanding what he read; he had many dreams, and he slept poorly. He dropped out of school for more than 3 months, did not get prompt therapy, but before his illness was completely ameliorated, he returned to school. Subsequently, he was assigned to live and work in a rural production team. During his 6 years in a rural village, he was a barefoot doctor. In 1973, he was selected to attend university, where he gradually discovered that each time he had a headache, it was always related to the appearance nearby of some picture. Whenever he was working, thinking, or talking to someone, if anything with a picture came into his line of sight, he would have a headache or his headache would get worse. As a result, he frequently worried about the reason for this phenomenon, and tried to get rid of this pain. In 1975, his headaches worsened, and he began to take tranquilizers. In 1977, following graduation, he was assigned to work as a Chinese herbal doctor and to perform acupuncture and moxibustion work. The patient was thoroughly unhappy with this specialized employment, feeling that it had no future and that people would look down on him. His mental pressures increased daily, and he became pessimistic, dejected, and greatly upset. Subsequently, he was diagnosed at the Beijing No 3 Hospital as an obsessive compulsive neurotic. He once tried unsuccessfully to be transferred to other work. His condition grew worse. In addition to headaches and insomnia, a series of fantasies repeatedly occurred in his brain, which he was unable to get rid of. His memory became worse for a long period of time; he had palpitations; his hands and feet perspired, and he vomited from nausea. He took tranquilizers in ever larger doses, going from 7.5 mg per day at first to 45 mg, but still without being able to control the symptoms. For a year he had been taking xiaojil'anding [4285 1015 1344 1353], to which he had become addicted. If he failed to take it for a day, withdrawal reactions resulted, and if he stopped

taking it for 3 days, he became dizzy and walked with a stagger. Each time he entered a room to study, he exhibited obsessive checking behavior. He first had to examine items in his surroundings before he could be at ease. This checking behavior made it difficult for him to concentrate his energies on studying. He had been previously diagnosed by the psychiatric departments of other hospitals.

The patient was a full-term baby who had been born without difficulty. He is healthy in body. He did well in both primary and middle school, where he was fond of reading picturebooks. There is nothing abnormal in his family history. He is meticulous to a fault, and when he reads he pays excessive attention to pronunciation. He studies earnestly, but he is somewhat inclined to be concerned with the unimportant. He is pessimistic about the future.

The patient speaks logically, to the point, and with lucidity. He possesses good self-knowledge and has a normal sense of direction. He earnestly sought therapy.

In view of the patient's obsessive notions and obsessive checking behavior, his emotional tenseness, and the appearance of autonomic nervous symptoms, plus the patient's own statement that he has been obsessed with planning to harm others, he was preliminarily diagnosed as an obsessive compulsive neurotic.

In July 1979, the patient began to undergo behavior correction therapy. Except for an interruption in therapy caused when he visited a relative midway in the therapy, his therapy lasted for somewhat more than 2 months. Though this was a short period of time, while the patient was undergoing exercises, he mastered methods quite rapidly and results showed quickly. By the end of September, he had stopped using tranquilizers. He began to stop too quickly, so he still had withdrawal reactions. Subsequently he gradually reduced the amount until he quit entirely. He has completely stopped using all medicines as of now. His condition has taken a marked turn for the better. Each time he exercises, his headache disappears, and he is able to control and to eradicate obsessive notions and checking behavior. His insomnia, palpitations, and nauseous vomiting have virtually disappeared. He is able to go to work and live normally. A major problem remaining is his interest in his work. He still wants those in charge to find a suitable solution to this problem.

Case 3. Female, 26 years old. University graduate. Unmarried. Came to hospital for diagnosis in early 1978 suffering from obsessive notions and obsessive actions. Following graduation in 1975 from medical school, the patient had been uninterested in medicine. Her schoolwork had not been good, and when assigned to gynecological and obstetrical work, she became very tense and her dread psychology became serious. At work, she dared not give inoculations. When she held the needle in her hand, her hand trembled. She was afraid of administering the wrong drug, checking repeatedly to make sure, but even after checking, she continued to worry. As early as 1970, the patient had joined the army and had been sent to Tibet where she had become close friends with a male in the same unit and for whom her feelings had become very deep. But the patient's parents were greatly opposed, so by using the pretext of her young age [her parents] had them separated.

The patient became greatly upset as a result, and this event has been the major source of her anguish and recollections for a long time. Since 1979, she has exhibited some ritualized obsessive behavior. She folds her quilts and folds her clothes for long periods of time according to a rigid sequence in a very strange and slow behavior. After going to the toilet, she has to turn her head in many directions to make a check before leaving the toilet. She thinks constantly about her former boyfriend. Though she knows quite well that he has married and has a child, she is unable to restrain herself. The image of the man is etched in her brain, so much so that her work was impaired and she entered a hospital in November 1975. There, following diagnosis of schizophrenia, she was given chlorpromazine for treatment. But since the patient was aware this medicine produced side-effects, she was averse to taking the chlorpromazine. In February 1976, she left the hospital to recuperate at home for more than 2 months. The hospital sent her to physiotherapy, but the symptoms were in no way reduced by the process. She was unable to rid herself of the obsessive thoughts, and the physiotherapy seemed to intensify the frequency of her obsessive ritualistic behavior.

The patient was born after the normal period of gestation and without difficulty. She grew normally and was an average student in primary school, where she had a skin allergy. Physical examination showed her normal in every other way. The patient's family has no history of special illnesses. Her father has a grouchy disposition. The patient's family circumstances have been superior ever since her childhood. She was pampered from childhood and is willful. For a long period as a child, she lived alone with her father, and as a result of her father's strict training, she became timid and fearful. Reclusive by temperament, she likes to sulk and is hypersensitive. She has never liked sports activities.

In mid-1979, the patient underwent behavior correction therapy. Early on, following several psychological therapy sessions in which the causes of her illness were analyzed and she was talked to about mental health, the patient very quickly corrected her stubborn attitude about love, and after understanding herself and realities, she indicated a desire to transfer the object of her affection. With this proper understanding as a basis, the patient became extremely active in learning heart rate feedback and relaxation techniques. At the same time, through systematic desensitization, the patient gradually resolved her dread psychology toward her specialty and the obsessive ritualistic behavior in her daily life. Subsequently, she learned through dynamic yishou to control and stop unrealistic obsessive fantasies. The effects of the above behavior training methods were very marked. The patient took the initiative at the outset of the exercises to stop taking medicine, and now her condition has made a striking turn for the better. She is able to work and live normally, and after having been introduced to male friends by relatives, she is able to have a normal love life. A followup interview on the telephone showed all was well.

Discussion

Psychological therapy is the major link in behavior-correction therapy. The total therapy may be regarded as having two stages. The first stage is an increase in cognitive ability. Once the patient understands the reasons for his illness and the principles underlying therapy, the initiation of suitable behavior

exercises is easier. The second stage is an increase in control ability. Following repeated exercises, the patient learns to reduce his heartrate and to relax his skeletal muscles, to use yishou methods to transfer and stop obsessive fantasies and obsessive feelings, and gradually to form new habits. Thus, the former is cognition study, and the latter is study to stimulate and cause the formation of new, connected, habitual behavior. Neither stage can be omitted.

The goal of this outpatient training was merely to teach a set of methods. Twenty minutes of decreased heartrate and improvement in emotional symptoms are only temporary, and the effects are not permanent, so the patient and the doctor must make an unambiguous evaluation. Only when the patient makes these methods and principles a part of his life and his work can the individual shortlived benefits begin to accumulate, so that he will have enduring benefits from the therapy. Consequently, following the second course of therapy, the patient should gradually reduce his dependence on the measuring instruments in order to conduct the exercises by himself and make a self-evaluation. With a dramatic change in circumstances, control of emotional fluctuations also becomes possible. Thus, successful therapy requires that the patient himself play the main role in the therapeutic process.

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LIFE SCIENCES

REPORT ON TRIAL USE OF MMPI IN SOME PARTS OF CHINA

Beijing ZHONGHUA SHENJING-JINGSHENKE ZAZHI [CHINESE JOURNAL OF NEUROLOGY AND PSYCHIATRY] in Chinese Vol 13, No 3, Sep 80 pp 157-160

[Article by Song Weizhen [1345 4850 4176] and Zhang Yao [1728 3852], Institute of Psychology, Chinese Academy of Sciences; and Yang Huayu [2799 5478 3254], Beijing Anding Hospital: "Report on Trial Use of Minnesota Multiphasic Personality Inventory in Some Parts of China"*]

[Text] The Minnesota Multiphasic Personality Inventory (hereinafter termed MMPI) is a form of self-reporting inventory. In the more than 30 years since this inventory was drafted by the Americans Hathaway and McKinley in the early 1940's, it has been translated into the local language of many countries and applied to research work in anthropology, psychology, and medicine, and has found particularly widespread application in clinical diagnosis of psychoses. Test results in every country have demonstrated that this inventory has definite value for its reliability and applicability in the testing and classification of psychoses.¹ China has yet to witness a report on such research.

By way of exploring whether or not MMPI is applicable to China and, if applicable, whether revisions should be made we conducted an examination of 132 normal people and 92 schizophrenic patients. A report on the circumstances of the testing is given below.

I. Test Methods and Test Circumstances

1. Test Methods. MMPI was conducted abroad both through the use of individual cards and through the use of a manual, with the manual being used for group

*This work was conducted under the guidance of Professor Lin Chuanding [2651 0278 7844]. Participants in the work included Deputy Professor Chen Zhongkeng [7115 0112 1649], Zhang Boyuan [1728 0130 3293], and Zhou Yin [0719 5419] of Beijing University; Wang Dong [3769 2767], and Fu Weichen [0265 4885 5265] of the Tianjin Psychiatric Hospital; Cui Qiukeng [1508 4428 5087] of the Psychological Institute, Chinese Academy of Sciences; and Liu Xiaocong [0491 1420 5115] and Lu Meixia [7120 5019 7209], Beijing Anding Hospital.

testing. (1) In the card method, 566 cards were used, of which the content of 16 was duplicatory. On each card was printed a single sentence describing a person--i.e., the so-called subject. The person being tested is allowed, on the basis of his personal situation, to deposit each subject card in one of three boxes, marked "Yes" (indicating it pertains to his individual situation); "No" (indicating it does not pertain to his individual situation); or "undecided." The person being tested is urged to use the "undecided" box as little as possible, and not more than nine times at most. (2) In the manual method, 566 subjects are printed in a book, and an answer sheet corresponding to the subjects is provided. On the sheet are printed the words "Yes" and "No"; the person being tested is to make a mark on the basis of his personal situation with regard to each subject, marking either "Yes" or "No." In cases where he is undecided on a reply to the subject, he is to make no mark at all.

In 1966, this inventory was revised and is known as MMPIR. The method of use for the revision is the same as for the previous version, and no change was made in its contents. Only the sequencing of subjects was rearranged, with the most frequently used scales centralized in topics 1 to 399. This is a convenience in scoring but does not impair reliability. At the time of use, a mark is recorded for each subject on the basis of scoring keys for 14 scales. The first four of these are validating scales, and the remaining 10 are clinical scales, which are now marked as follows:

Validating Scales:

Q--Questionable grade. Total number of times answer given as "undecided" is the criterion. High score indicates person tested escapes from reality.

L--Lying grade. High score indicates replies not truthful.

F--Feigning illness score. High score indicates intentional feigning of illness, seriously paranoid, incorrect scoring, or carelessness in making replies.

K--Compensation score. High score indicates subtle defense reaction.

Clinical Scales:

Hs--Hypochondriasis

D-- Depression

Hy--Hysteria

Pd--Psychopathic deviate

Mf--Masculinity-femininity

Pa--Paranoia

Pt--Psychasthenia

Sc--Schizophrenia

Ma--Hypomania

Si--Social Introversion

In addition to the above 14 scales, there are also Es (ego strength), Dy (dependency), Do (dominance), and Pr (prejudice), among others. Most are directly related to pathology, and so of the 566 topics on the complete form, 400 through 566 are useless for our research purposes.

The R form was used in this research, and for the subjects used, Hong Kong Chinese University's translation was used for reference.² In order to facilitate comparison with conclusions from abroad, no major changes were made in content; revisions were made to individual words only.

Analysis of results was entirely in accordance with methods recommended by Hathaway. There was a division into male and female groups, with the raw scores for each scale being figured first. To the Hs, Pd, Pt, Sc, and Ma scales were added the corresponding K compensation scores, and these were converted to the T scores for each scale. The purpose of adding the compensation numbers was to increase the differentiation among the five scales. According to Hathaway, the K scores to be added should be (1) Hs + 0.5 K; (2) Sc + 1.0 K; (3) Pd + 0.4 K; (4) Ma + 0.2 K; and (5) Pt + 1.0 K.

$$T = 50 + \frac{10 (X - M)}{SD}$$

In the formula, X stands for raw score; M is the mean score; and SD is the standard deviation. Since the sampling was quite small in this study, following precedent established abroad, prior to enlarging the scope the conversion of the T score temporarily used the original MMPI table, with which a T score in excess of 70 was usually abnormal.

Inasmuch as the principal objective of this test was to explore whether or not MMPI is applicable to China, conclusions were not drawn for every person tested; consequently, in the analysis of conclusions, fullest use was not made of the various indicators in the validating scales (for example, throwing out materials when the material had Q scores in excess of 9, and cases in which answers to duplicated questions were not the same more than four times). Instead, a full analysis was made of all data.

II. Test Circumstances

1. Normal Group. As tables 1 and 2 show, on the clinical scales the D and Sc scale marks for the normal male group were fairly high.
2. Schizophrenic Group. As tables 3 and 4 show, on the clinical scales, the D, Pt, and Sc scale scores for the male patients group were high, and the PA and Sc scale scores for the female patients were quite high, all of them exceeding 70. The Sc scale was particularly conspicuous.
3. A comparison of the normal group with the schizophrenic group: It may be seen from an analysis of the test results for these two groups that on the clinical scales, in the case of both the males and the females, that following t-texting of the raw scores of the Pa and Sc scales, there was a conspicuous difference (tables 5 and 6, and plates 1 and 2)

Table 1. Mean Scores on Each Different MMPI Scale for 62 Normal Males

	Raw Scores	Raw Scores + K	T Scores
	Mean Score ± Standard Deviation	Mean Score ± Standard Deviation	(+ K)
Q	4.58 ± 2.82		43
L	7.18 ± 2.94		60
F	12.47 ± 4.19		73
K	12.82 ± 4.56		51
Ha	8.16 ± 4.72	14.90 ± 5.06	59
D	27.63 ± 5.29		77
Hy	21.53 ± 5.60		60
Pd	18.37 ± 4.72	23.47 ± 4.35	62
Hf-m	27.73 ± 4.01		65
Pa	12.34 ± 3.38		62
Pt	17.16 ± 7.95	29.82 ± 5.74	64
Sc	20.81 ± 8.76	33.63 ± 6.99	73
Ma	18.00 ± 4.93	21.08 ± 5.16	60
Si	33.63 ± 8.14		61

Table 2. Mean Scores on Each Different MMPI Scale for 70 Normal Females

	Raw Scores	Raw Scores + K	T Scores
	Mean Score ± Standard Deviation	Mean Score ± Standard Deviation	(+ K)
Q	5.07 ± 3.78		43
L	7.23 ± 3.07		60
F	12.57 ± 4.97		73
K	12.76 ± 4.92		51
Ha	9.84 ± 5.62	16.47 ± 5.68	58
D	29.19 ± 4.96		69
Hy	22.83 ± 6.12		57
Pd	17.21 ± 4.76	22.29 ± 4.41	57
Hf-P	32.31 ± 4.19		59
Pa	11.79 ± 4.42		62
Pt	18.23 ± 8.18	30.87 ± 5.28	60
Sc	22.06 ± 10.48	35.03 ± 7.48	69
Ma	17.01 ± 4.98	19.61 ± 4.47	58
Si	36.91 ± 7.69		64

Table 3. Mean Scores and Standard Deviation on Each MMPI Scale for 47 Schizophrenic Male Patients

	Raw Scores	Raw Scores + K	T Scores (+ K)
	Mean Score ± Standard Deviation	Mean Score ± Standard Deviation	
Q	5.74 ± 5.18		43
L	7.71 ± 3.29		63
F	15.34 ± 6.64		78
K	14.62 ± 5.93		55
Ha	9.40 ± 4.90	16.87 ± 5.86	65
D	27.96 ± 4.83		77
Hy	22.83 ± 6.27		62
Pd	18.89 ± 4.78	24.38 ± 4.78	64
Mf-m	26.53 ± 4.71		63
Pa	15.19 ± 4.31		70
Pt	19.77 ± 9.23	34.36 ± 5.50	73
Sc	26.62 ± 11.61	41.00 ± 7.43	86
Ma	18.68 ± 5.25	21.77 ± 4.37	63
Si	32.77 ± 6.85		60

Table 4. Mean Scores and Standard Deviation on Each MMPI Scale for 45 Schizophrenic Female Patients

	Raw Scores	Raw Scores + K	T Scores (+ K)
	Mean Score ± Standard Deviation	Mean Score ± Standard Deviation	
Q	5.42 ± 4.80		43
L	7.96 ± 2.66		63
F	15.87 ± 6.13		80
K	14.16 ± 4.78		53
HS	9.56 ± 5.18	16.89 ± 5.21	58
D	29.44 ± 6.06		69
Hy	23.16 ± 6.30		57
Pd	18.56 ± 4.76	24.04 ± 4.98	62
Mf-f	29.31 ± 4.25		66
Pa	15.91 ± 4.74		73
Pt	21.16 ± 8.10	35.62 ± 5.63	68
Sc	27.04 ± 11.02	40.8 ± 8.27	78
Ma	18.51 ± 5.88	22.29 ± 5.52	63
Si	34.49 ± 6.67		61

Table 5. Comparison of MMPI Clinical Scale Raw Scores for Normal and Schizophrenic Patients (Males)

	Normal People (62)	Patients (47)	t value		Normal People (62)	Patients (47)	t value
Ha	8.16	9.40	1.348	Pa	12.34	15.19	3.900*
D	27.63	27.96	0.337	Pt	17.16	19.77	1.591
Hy	21.53	22.83	1.146	Sc	20.81	26.62	2.995**
Pd	18.37	18.89	0.571	Ma	18.00	18.68	0.723
Mf-M	27.73	26.53	1.446	Si	33.63	32.77	0.587

* $P < 0.001$ ** $P < 0.01$

Table 6. Comparison of MMPI Clinical Scale Raw Scores for Normal and Schizophrenic Patients (Females)

	Normal People (70)	Patients (45)	t value		Normal People (70)	Patients (45)	t value
Ha	9.84	9.56	0.267	Pa	11.79	15.91	4.763*
D	29.19	29.44	1.042	Pt	18.23	21.16	1.866
Hy	22.83	23.16	0.277	Sc	22.06	27.04	2.42**
Pd	17.21	18.56	1.378	Ma	17.01	18.51	1.458
Mf-f	32.31	29.31	3.704*	Si	36.91	34.49	1.721

* $P < 0.001$ ** $P < 0.05$

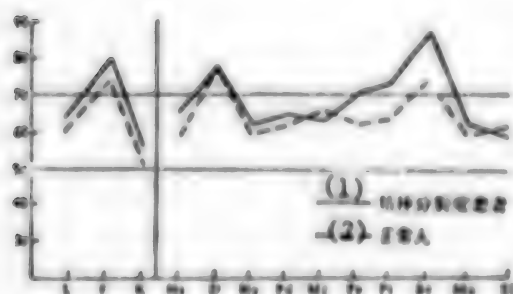


Plate 1. Male Test T Score Graph

Key:

- (1) Schizophrenic patients
- (2) Normal people

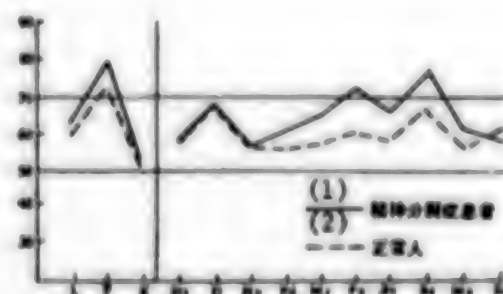


Plate 2. Female Test T Score Graph

Key:

- (1) Schizophrenic patients
- (2) Normal people

4. Duplicate Testing. As is shown in Table 7, apart from the fact that the relative coefficient of Pa was not very striking, the reliability of all other 13 scales were highly striking.

Table 7. Reliability of MMPI Scale Retesting of Normal People

	Relative Coefficient	P Value		Relative Coefficient	P Value
L	0.889	P < 0.001	MF-M	0.845	P < 0.001
F	0.914	P < 0.001	Mf-f	0.825	P < 0.001
K	0.683	P < 0.005	Pa	0.658	P < 0.01
Ma	0.820	P < 0.001	Pt	0.955	P < 0.001
D	0.853	P < 0.001	Sc	0.849	P < 0.001
Hy	0.670	P < 0.01	Ma	0.925	P < 0.001
Pd	0.480	0.05 < P < 0.1	Si	0.859	P < 0.001
			Mean Score	0.802	

Discussion

1. It may be seen from an analysis of the data that in the testing process, if the tester is able to explain clearly to the person being tested the matters requiring attention in the test, most persons tested can reduce to less than nine the number of their "undecided" replies (i.e., the Q scores). On this particular test, the average number of "undecided" replies did not exceed six for either the normal or the schizophrenic patients. In fact, in only 10 cases (7.6 percent) did "undecided" replies from the normal people exceed 9. Replies of "undecided" exceeded 9 in a total of 15 cases (15.2 percent) for the schizophrenic patients, and subjects for which this reply was made pertained mostly to problems of sex. For those tested who were not married, an answer was in fact difficult. In addition, we conducted retesting twice on 15 normal people. The relative coefficient in the double-testing results was highly remarkable for all scales except the Pd scale, which was not outstanding, showing that this test has definite reliability. From this it may be seen that, following revision, this inventory may be applied in China.

In the clinical scales for normal people tested, the marks for the D and Sc scales were higher than for other scales, particularly for males. The T score for these two scales exceed internationally established normal limits. This is similar to the results obtained in Hong Kong² and Japan.¹ As Butcher et al¹ have said, this situation is possibly related to the translation of words and to differences between Oriental and Occidental customs and habits.

3. When an analysis was conducted of the results of testing of the schizophrenic patients, we saw that on the clinical scales, patients both male and female had T scores for Sc and Pa greatly in excess of usual levels. After t testing, the difference in the raw scores was striking (tables 5 and 6 and plates 1 and 2),

while the other scales were not striking except for *Mf*. Reasons why the scores for female schizophrenic patients on the *Mf* scale were higher than for normal people of the same sex await further analysis. For these reasons, we feel that these tests have high value for reference in the clinical diagnosis of psychoses, and of paranoid schizophrenia in particular.

4. It was discovered in the course of testing that as a result of differences in social culture and living habits, many of the subjects on the inventory do not suit the situation in China. Questions about religion, questions about sex, and questions about employment, for example, the persons being tested found difficult to answer. At the same time, how to change the wording to suit China's habits while avoiding inverted sentences and double negative sentences that might easily lead those being tested to misunderstand are matters requiring our profound exploration and solution.

The goal of this testing was only to furnish a preliminary exploration of whether or not *MMPI* is suitable for use in China. Because of the limited number of places and the small number of people that have been tested up till now, we must await a larger volume of testing research in various places throughout the entire country.

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ESTABLISHMENT OF EYE BANK SAID URGENTLY NEEDED

Beijing GUANGMING RIBAO in Chinese 3 Oct 80 p 1

[Text] Most recently the author, Peng Zhouxian [1756 0719 6343], paid a visit at the Ophthalmological Hospital of Zhongshan College of Medicine and felt profoundly the need for quickly establishing an eye bank.

The Ophthalmological Hospital of Zhongshan College of Medicine is a specialized hospital of the largest scale in China, and is also the hospital demonstrating a relatively obvious treatment effect of corneal diseases in recent years. In such a hospital, there is no eye bank, however. An eye bank is a place to collect and preserve eyeballs. It is a basic facility for scientific research, clinical treatment of the blind, and for the care of eye diseases. Some advanced countries established eye banks as early as the 1940's. At present, not a few Third World countries, such as Sri Lanka, have also established eye banks of their own.

In China, a number of medical units made progress in corneal transplant in the 1950's. Due to the fact that the source of cornea was uncertain and there was no eye bank, the project had to be discontinued in many units. The Corneal Disease Group of the Ophthalmological Hospital of Zhongshan College of Medicine is composed of four physicians only, including Prof Du Nianzu [2659 1819 4371]. In order to obtain corneal materials, they have to secure the support of all the hospitals and to go to fetch the cornea immediately whenever a willing donor is found. In the past 2 decades, under this condition of extreme deficiency of materials they treated a total of 1,800 patients coming from all over the country as well as overseas. In recent years, a number of world famous eye specialists have come to observe their work and exchange experience. These specialists were expressedly impressed by the achievement of this group in corneal transplant when the work had to proceed under such difficult conditions.

During last year's National Congress of Ophthalmology, a National Corneal Diseases Prevention and Treatment Cooperative Group to be in charge of that hospital was officially established. During the meeting, many delegates proposed the establishment of China's first eye bank at that hospital in order to promote the country's work of preventing blindness. The establishment of the eye bank has not been implemented to this day, however.

Prof. Du Nianzu and his assistants, who are responsible for a rapid development of theoretical research of ophthalmology in China to bring this field to the advanced level of the world, hope the leadership departments will pay attention to the problem and help to resolve it quickly so that such a large country as ours with a population of 1 billion definitely has a claim in this important field of prevention and treatment of blindness.

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CSO: 4008

LIFE SCIENCES

NEW ADVANCES MADE IN GASTRIC CARCINOMA RESEARCH

Beijing GUANGMING RIBAO in Chinese 11 Oct 80 p 1

[Text] It has been announced here that China's first strain of human gastric cancer cell line has been established in Shanghai, and it has been identified this afternoon. This cell line was established through more than a year's joint efforts by Shanghai Municipal Sixth People's Hospital, the Department of Biology of Fudan University, Shanghai Municipal Institute of Oncology, and Shanghai Municipal Bureau of Public Health. At present, that line has been stably cultured to the 73rd generation (a minimum of 30 generations are needed for the cell to have value for research.) Inoculation in animals has also been successful. This achievement marks a forward step of China's research work on gastric carcinoma, and is an important fruit of scientific research in its goal of catching up and surpassing the advanced level of the world in the field of prevention and treatment of tumors.

Incidence of gastric cancer is the highest among malignant tumors in China, and its mortality rate is one of the highest. The establishment of a gastric carcinoma cell line provides an important condition for looking for a convenient, reliable, and new immunological method of its diagnosis. Furthermore, it is also significant in such aspects of basic research as drug selection, the science of structure and morphology of cells of gastric carcinoma, etc.

In May 1979, the Shanghai Municipal Sixth People's Hospital and the Institute of Genetics of Fudan University obtained a piece of cancer tissue from a female victim of gastric carcinoma and proceeded with extra-corporal culture. Through such techniques as microscopic observation and microscopic photography, they discovered that the cultured cell possessed the characteristic structure of malignant cells. In May of this year, the researchers of Shanghai Institute of Pharmacology, Chinese Academy of Sciences inoculated the cultured cancer cell to the anterior chamber of the eye of rabbits and in the hypodermic tissues of white mice. Success was obtained. It was also discovered that the tumor produced after hypodermic inoculation in white mice demonstrated localized lymphatic metastasis and the condition of infiltration of cancer cells in the muscular layer. The Institute of Pharmacology, the Sixth People's Hospital, and the Department of Biology of Fudan University used the extra-corporal cultured cells and the tumor formed on the animals to proceed with pathological observation, electron microscopic examination, and histochemical study to determine that they are truly gastric carcinoma cells. At present, the gastric carcinoma cell line is preserved in liquid nitrogen, and the resuscitation rate is as high as 98 percent.

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TITLE: "A New Variety of Bacillus thuringiensis Berliner"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 1, 1980 pp 1-5

TEXT OF ENGLISH ABSTRACT: A parasporal crystal forming bacillus "7216" was isolated from dead Pectinophora gossypiella Saunders in 1972. This bacillus has the typical characteristics of Bacillus thuringiensis. Its serotype belongs to H₃, but it is distinguished from the varieties alesti and kurstaki in cultural characteristics and biochemical reactions. This bacillus is, therefore, considered to be a new variety and the trinomial Bacillus thuringiensis var. tianmensis (7216) is proposed.

Bacillus thuringiensis var. tianmensis (7216) is easy to cultivate by industrial fermentation and to be used as an insecticide. It is more effective in the control of Pectinophora gossypiella than is any other microbial insecticide commonly used in China.

Type culture of this new variety is deposited in Tianmen Institute of Microbiology, Hubei, China.

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CHEN Baolian [7115 1405 5571]

ORG: YAN, ZHANG and XING all of the Institute of Microbiology, Chinese Academy of Sciences, Beijing; QIU, SHEN, DAI and CHEN all of Shanghai Institute of Pharmaceutical Industrial Research, Shanghai

TITLE: "A New Species of Streptomyces Producing Streptonigrin"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 1, 1980 pp 6-9

EXCERPT OF ENGLISH ABSTRACT: While screening new antitumor antibiotics, a species of Streptomyces designated as No 74-3527 was isolated from a Xishuangbanna soil sample. According to the UV, IR and NMR spectra, this strain produces an antitumor antibiotic which is identical to Streptonigrin formed by Streptomyces flocculus. Taxonomic studies show that the strain No 74-3527 is a new species among the Streptomyces cinerogriseus group and was named Streptomyces streptonigrinus n. sp. Yan et al. 1977.

AUTHOR: LU Yunyu [4151 6663 3768]

ORG: Institute of Microbiology, Chinese Academy of Sciences, Beijing

TITLE: "Numerical Taxonomic Study on 55 Streptomyces Strains"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 1, 1980 pp 10-15

TEXT OF ENGLISH ABSTRACT: 1. By means of numerical taxonomic methods, 55 strains of Streptomyces were analyzed with 50 characteristics being examined. When the similarity percentage is at a level beyond 84 percent, four groups may be distinguished, i.e., Streptomyces groups of glaucus, lavendulae, cyaneus and aureus. 2. Taxonomic relation diagrams were made from the similarity values which showed the relationships among these groups. The results obtained are compatible with those from traditional taxonomy. 3. From the taxonomic chart of this paper, one might visualize that the various colors of spores of Streptomyces cultures are distributed regularly. Cultures of similar colors run into the same group. It seems to justify the fact that spore colors are a stable characteristic and merit attention in taxonomy.

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TITLE: "New Rust Fungi from Western China"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 1, 1980 pp 16-28

TEXT OF ENGLISH ABSTRACT: In 1975-1978, the Commission of Integrated Survey of Natural Resources, Chinese Academy of Sciences, organized two comprehensive scientific expedition trips to Xizang (Tibet) and Xinjiang (Chinese Turkestan). Mycological workers participated in the expeditions. Many specimens of fungi were collected and lists of fungi identified from these regions have been prepared and will be published elsewhere. In this paper 15 new species of rust fungi collected from these regions are reported. Among these new rusts some are distinguished from those found in coastal regions. Chrysomyxa stilbae Wang, Chet et Guo n. sp. e.g., has its telia very much like those of the authentic Chrysomyxa. It has, however, a stilbum-like hyphae-bundle stalk somewhat like a sporophore at the

[Continuation of WEISHENGWU XUEBAO Vol 20 No 1, 1980 pp 16-28]

base of the telial head. The hyphae-bundle stalk which measured from 0.5 to 1 mm raises the telial head above the leaf surface. Balfour-Brown, in a paper on Himalayan Fungi, stated: "The teleutosori of Chrysomyxa spp. on Asiatic Rhododendron species form a series showing a gradual difference in size from the small, sessile C. dietelii, through the somewhat larger, still sessile, C. taghishae and the shortly stalked forms of C. himalense, from Simla and Nepal, to the large, long-stalked Tibetan forms (Taylor 4324) of this latter species. Experimental work can only decide whether these forms do, in fact, represent distinct species or merely growth responses of the different species of host plant." On reexamination of a specimen from Qinghai (HMAS 24398) named by the senior author as C. rhododendri deposited in this Herbarium, the present authors found that it also has a stilbum-like hyphae bundle beneath the telial head. This Qinghai specimen coincident with C. succinea (Sacc.) Tranz. is therefore verified. The present new species from Xizang is further distinguished from other Chrysomyxa mentioned above in having larger teliospores and longer teliospore-chains.

In naming the new fern rust, Uredo pseudocystopteridis, the authors seriously considered Article 59 of the International Code of Botanical Nomenclature (1972). Having strictly followed this article, the authors have denominated it to the form genus Uredo. Otherwise, it might have been named under the generic name Hyalopsora since this fern rust does have colored uredinial spores readily distinguishable from the other two genera Uredinopsis and Milesina on ferns.

[Continuation of WEISHENGWU XUEBAO Vol 20 No 1, 1980 pp 16-28]

Spore states, such as uredinial, in the genus Hyalopsora which can be used to ascribe the organism to the correct genus of the perfect state should be legitimated and the generic name of the perfect state could be used in the case of a specimen not provided with the telial state. Of course, it would be preferable to make a proposal to the Nomenclature Committee of the International Botanical Congress and the International Mycological Congress for a decision in the coming meeting.

AUTHOR: ZANG Mu [5661 4476]

ORG: Kunming Institute of Botany, Chinese Academy of Sciences, Kunming

TITLE: "Some New Species of Basidiomycetes from the Xizang Autonomous Region of China"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 1, 1980 pp 29-34

TEXT OF ENGLISH ABSTRACT: The mycoflora of the southeastern area of Xizang (Tibet) is very rich and complex. Among the many fungous specimens collected by the author during his investigations to this region, five new species of Basidiomycetes are identified:

1. Boletinus lignicolus Zang: Closely related to Boletinus punctatipes Snell et Dick, but differs in its glabrous stipe, larger basidiospores ($4.9 - 6.2 \times 12 - 14.8 \mu m$) and its lignicolous habitat, especially the parasitism on Pinus densata Mast.
2. Boletus magasporus Zang: Found in swampy forests. Distribution of this species seems to be limited to both sides of the Nuchiang River in Yunnan Province and the southeastern region of Xizang. It resembles Boletus puniceus Chiu in appearance, but differs in that the stipe of the new species is smooth and the basidiospores larger ($7 - 8.5 \times 18 - 20 \mu m$) and it tastes bitter.
3. Cantharellus tuberculosporus Zang: Characterized by its larger size of basidiocarp, the bright yellow color of pileus and hymenophore, and the tuberation of

[Continuation of WEISHENGWU XUEBAO Vol 20 No 1, 1980 pp 29-34]

spores, which distinguish this new species immediately from Cantharellus yunnanensis Chiu.

4. Lycoperdon fusiforme Zang: Closely related to Lycoperdon muscorum Morg., but differs from it in its spindle-shaped basidiocarp and its smaller basidiospores ($2.4 - 3.7 \mu m$ in diameter).
5. Cyathus discoldeus Zang: Remarkable for the fact that the stipe of its basidiocarp possesses a disc-like base which discriminates this species from Cyathus olla (Batsch) Pers. as well as from other species in the same genus.

AUTHOR: ZHENG Ruyong [6774 0320 3057]
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ORG: Both of the Institute of Microbiology, Chinese Academy of Sciences, Beijing

TITLE: "Taxonomic Studies on the Genus Sawadaea of China. I. Recognition of the Genus Sawadaea and the New Species and New Combination on Aceraceae and Hippocastanaceae"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 1, 1980 pp 35-44

TEXT OF ENGLISH ABSTRACT: Reasons for the recognition of the genus Sawadaea Miyabe have been fully discussed and the conclusion is that since both the perfect and imperfect states of this genus differ greatly from the genus Uncinula, it is rational to segregate this group of powdery mildews from the genus Uncinula and to recognize it as an independent genus. Six species of Sawadaea are collected from China, including all four of the known species formerly reported and two other new species. They are: Sawadaea tulasnei (Fuck.) Homma, Sawadaea negundinis Homma, Sawadaea bicornis (Wallr. ex Fr.) Homma, Sawadaea polyfida (Wei) comb. nov., Sawadaea boniensis sp. nov. and Sawadaea aesculi sp. nov. Whereas the first five species are parasitic on Acer (Aceraceae), the sixth and last species is parasitic on Aesculus (Hippocastanaceae). This is the first record of the ascus state of Sawadaea on a new host family other than Aceraceae. The discovery of the conidial

[Continuation of WEISHENGWU XUEBAO Vol 20 No 1, 1980 pp 35-44]

state of Sawadaea tulasnei (Fuck.) Homma is also the first record of the imperfect state of Sawadaea from China. A key to the species is presented. Chinese and Latin diagnoses for the new species, Chinese diagnoses for the new combination and the imperfect state of Sawadaea tulasnei (Fuck.) Homma are given. Differences between related species are also discussed.

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TITLE: "Taxonomic Studies on the Genus Erysiphe of China. I. New Species and New Variety of Caprifoliaceae"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 1, 1980 pp 45-49

TEXT OF ENGLISH ABSTRACT: Two new taxa of Erysiphe parasitizing on Caprifoliaceae, i.e., Erysiphe abeliae sp. nov. on Abelia sp. collected from Sichuan Province, and Erysiphe sambuci Ahmad var. crassitunicata var. nov. on Sambucus adnata Wall. collected from Xizang Autonomous Region (Tibet), are described.

Erysiphe abeliae sp. nov. is a very interesting powdery mildew. Nearly all of its appendages are typical of the Erysiphe-type, but one appendage among approximately 500-1000 appendages may be found to be typical of the Uncinula-type. This phenomenon reveals the close relationship between these two genera. The authors think that the discovery of this fungus lends great support to the view that the genus Uncinula is developed from the genus Erysiphe concerning the phylogeny of the powdery mildews.

[Continuation of WEISHENGWU XUEBAO Vol 20 No 1, 1980 pp 45-49]

Latin and Chinese diagnoses are given for the new species and the new variety. Reasons for erecting these new taxa are also discussed.

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TITLE: "Morphology and Structure of Several Tailed Phages"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 1, 1980 pp 50-53

TEXT OF ENGLISH ABSTRACT: Several distinct types of tailed phages on six host strains, namely, Streptomyces kanamyceticus, Streptomyces aureofaciens, Xanthomonas oryzae, Corynebacterium crenatum, Bacillus polymyxa and Bacillus thuringiensis, belonging to groups A, B and C according to Bradley, were studied for their morphology with special reference to the heads and tail-ends. It is of special developmental importance to compare tail-end structures among phages from different sources. It is convenient to make precise descriptions of head structures by PTA-negative staining as well as by interpretive geometric configurations from electron

[Continuation of WEISHENGWU XUEBAO Vol 20 No 1, 1980 pp 50-53]

micrographs, both of which are discussed in detail. In addition, on the basis of its peculiar tail-end structure, phage TP35 on Bacillus thuringiensis should be recognized as a new type.

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TITLE: "Studies on a Heteroplasmic Mutant of Streptomyces aureofaciens Induced by Colchicine"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 1, 1980 pp 54-59

TEXT OF ENGLISH ABSTRACT: 1. In comparing the mutagenic effect of colchicine with that of ultraviolet, nitrogen mustard and acriflavine for inducing heteroplasmic mutation, only colchicine yields a satisfactory result.
2. The heteroplasmic mutant has larger conidia with more germ tubes during germination than does the original strain.
3. In colony formation every colony of the heteroplasmon showed morphological persistent segregation, thus producing two or more normal sectors. Conidia from the central part of the heteroplasmic colony possessing the morphological persistent segregation form heteroplasmic colonies, while conidia from the normal sectors formed only heteroplasmic normal type colonies. It thus suggests that there are two kinds of cytoplasmic determinants in the heteroplasmic conidia.

[Continuation of WEISHENGWU XUEBAO Vol 20 No 1, 1980 pp 54-59]

4. The non-recovery of a pure-breeding mutant in a heteroplasmic colony further suggests that the mutated gene is due to the lethal substances in the homoplasmic state.
5. The results of the heterocaryon test showed that the segregant with normal nucleus forms normal type colonies only, therefore suggesting that there is a special nucleocytoplasmic relationship between the mutated cytoplasmic gene and the nucleus. In addition, an unstable merozygote is screened out and the colonial morphology of the merozygote lies between the other two kinds of segregants, without showing any morphological persistent segregation. It further suggests that the phenotype of the mutated gene is inhibited by the normal nucleus in the merozygotic state.
6. The effect of the mutant cells under the exposure of ultraviolet radiation showed that this strain possesses greater resistance than does the normal type strain, but the killing curve of the mutant is quite different from that of the diploid or double-nucleus strain. It is therefore concluded that the increasing resistance of the mutant is due to the action of the cytoplasmic gene.

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TITLE: "In Vitro Reconstitution of Infectious Particles from Influenza Virus RNA and Influenza Virus Polymerase"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 1, 1980 pp 60-67

TEXT OF ENGLISH ABSTRACT: 1. In vitro reconstitution of infectious particles from noninfectious influenza virus RNA and noninfectious cell-free enzyme-system extracted from influenza virus infected chorioallantoic membrane was reported. The particles, after being injected into the chorioallantoic cavities of 12-day chick embryos, resulted in virus multiplication.

2. Infectivity of the infectious particles was enhanced by prolonging the time of contact of the viral RNA with sodium phosphate buffer, pH 7.8, containing 0.5 M sodium chloride, or by heating it at 90°C for certain periods. Addition of DOC dissociated noninfectious virus materials also showed improved results, while the addition of DEAE-sephadex showed no beneficial effect.

[Continuation of WEISHENGWU XUEBAO Vol 20 No 1, 1980 pp 60-67]

3. The results obtained in this experiment may, in some measure, illustrate the important role of protein in the life process of the influenza virus, and provide a possibility for obtaining variant strains from influenza viruses.

AUTHOR: WU Jinwen [2976 6027 2429]
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TITLE: "The Observation and Identification of Entomophthora aulicae (Reich) Sorokin"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 1, 1980 pp 68-71

TEXT OF ENGLISH ABSTRACT: The epidemic disease on larvae Arctiidae and other insects of Lepidoptera infected by entomogenous fungi was found in the Hot Spring region, Anning County (Kunming district), Yunnan in 1978. The pathogen has been identified as Entomophthora aulicae (Reich) Sorok. The identification of this causal agent was based on isolation, inoculation and pathological anatomy (paraffin section) of the infected Alphaea phasma.

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TITLE: "Parasitization of Cladosporium cladosporioides (Fres) de Vries on Citrus Red Mites"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 1, 1980 pp 72-75

TEXT OF ENGLISH ABSTRACT: Cladosporium cladosporioides (Fres.) de Vries was found to parasitize the citrus red mite, Panonychus citri (McGregor), in Guangdong Province, China. The mortality of parasitized citrus red mites in the field varied with localities and collection dates ranging from 6.5 - 26.9 percent in an unsprayed orchard in Guangzhou to 10.0 - 81.0 percent in sprayed ones in Boluo County, Guangdong.

Pathogenicity tests were carried out with spore suspension in 0.5 percent tea bran solution at a concentration of 3.0×10^7 spores/ml. The mites began to die in 24 hours, the mortality rates being 62.3 percent, 88.1 percent and 97.2 percent in three, five and seven days respectively, while those of checks were 7.4 percent, 15.4 percent and 42.1 percent respectively. The dead mites with typical symptoms

[Continuation of WEISHENGWU XUEBAO Vol 20 No 1, 1980 pp 72-75]

appeared in three days. The conidiophore bearing conidia in braching chains of the fungus were found to grow out from the bodies of the dead mites. There is strong evidence that this fungus parasitizes the citrus red mite.

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TITLE: "Studies on Zhengguangmycins. II. Isolation, Purification, Physico-
chemical Characterization and Identification"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20
No 1, 1980 pp 76-81

TEXT OF ENGLISH ABSTRACT: The Zhengguangmycins, a complex of glycopeptide type antitumor antibiotics, is produced by Str. verticillus var. pingyanggensis n. var. This paper deals with the isolation, purification, physico-chemical properties and identification. Two major components, namely Zhengguangmycins A₂ and B₂, were isolated from the complex and identified as Bleomycin A₂ and B₂ respectively on the basis of their physico-chemical properties.

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TITLE: "Bacterial Leaching of Middle-Peer Nickel Ores"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20
No 1, 1980 pp 82-87

TEXT OF ENGLISH ABSTRACT: The Thiobacillus ferrooxidans strain T-7, which was effective for extraction nickel, was isolated directly from acid mine water in middle-peer nickel sulfide ore. This microorganism was able to extract 70-80 percent of the nickel from the ore 20 percent pulp density in seven days. The extraction was only about 5-6 percent in the control. The rate of the nickel leaching with bacteria was 12-15 fold faster than that in the sterile control.

The leaching conditions were as follows: ore particle size - 160 mesh; pulp density 20 percent; temperature 32°C; inoculating quantity 10 percent; acid consumption of bacterial leaching process saved more than 50 percent as compared with that by acid leaching. The efficiency of bacterial leaching in the shaking flask was in agreement with that of the column airperge when ore quantities of 20-2000 g were used.

[Continuation of WEISHENGWU XUEBAO Vol 20 No 1, 1980 pp 82-87]

Direct observation and determination of the bacterial action on the ore surface was carried out by the scanning electron microscope. Biological oxidation of the pentlandite has been investigated. The results obtained indicated that the bacteria may derive energy from the oxidation of sulfide to sulfite, which partially supplied the consumed acid during the bacterial leaching process. The nickel was extracted from the ore as bivalent nickel ion.

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TITLE: "Fermentative Production of Mixed Long Chain Dicarboxylic Acids from
n-Alkanes. I. Screening, Mutation and Identification of the Microorganisms"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20
No 1, 1980 pp 88-93

TEXT OF ENGLISH ABSTRACT: During the study of alkane metabolism, it was found
that considerable strains of yeasts can produce dicarboxylic acids.

Among more than 700 strains of yeasts tested, including 15 genera and some un-
identified species, about one-half can produce dicarboxylic acids, and 21 strains
yield more dicarboxylic acid than do the others. One of them is Rhodotorula sp.,
with some of the others being Candida tropicalis, C. lipolytica, C. brumptii,
C. parapsilosis, C. guilliermondii, C. melibiose and C. sake. Two-thirds of them
belong to C. lipolytica and C. tropicalis.

From these strains we selected C. tropicalis strains 1230 which yield shorter
chain dicarboxylic acids, but scarcely yielded monocarboxylic acid from n-alkanes.
In order to accumulate the dicarboxylic acids longer than 10 carbon atoms, strain
1230 was treated with Nitrosoguanidine and ultraviolet radiation.

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During the treatment the sebasic acid and dodecanedioic acid were used as the
indicative media respectively. Colonies which can grow on complete media but not
on this media were selected. A mutant strain U₃₋₂₁ which can yield dibasic acids
with chain lengths more than 10 carbon atoms from alkane mixture (C₁₀-C₁₄) has
been obtained. The yield of dibasic acid is 2.43 percent, which is four times
higher than that of the strain 1230. Mutant U₃₋₂₁ can grow well on long chain
alkanes, but cannot utilize dibasic acids, so that it can accumulate dibasic
acids. After improvement of the fermentation conditions, a yield of over 6 percent
dibasic acid was obtained.

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TITLE: "Isolation, Purification and Identification of the Antibiotic 4-215"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20
No 1, 1980 pp 94-99

TEXT OF ENGLISH ABSTRACT: Antibiotic 4-215 is produced by a strain of Nocardia sp. It shows a curative effect on bacterial blight of rice caused by Xanthomonas oryzae.

Antibiotic 4-215 has been crystallized as a colorless prism and it is an amphoteric compound, easily soluble in acid and alkaline water, moderately soluble in methanol and ethanol, but insoluble in acetone and other organic solvents. It gives negative reactions with ninhydrin, ferric chloride, 2, 4-dinitrophenyl hydrazine, an throne Molisch's and Sakaguchi's reagents. Its molecular weight is 285 and the empirical formula is $C_{10}H_{13}N_5O_4 \cdot H_2O$, with a specific rotation of $[\alpha]_D^{20} = -35.5$ (C = 1% in 0.1 N HCl), $[\alpha]_D^{24.5} = -72.11$ (C = 1% in MeOH), melting point 141-142°C. The ultraviolet absorption spectra are as follows: λ_{max} 234 nm ($E_{1cm}^{1\%} = 380$) and 295 nm ($E_{1cm}^{1\%} = 340$) (in 0.1 N HCl solution); λ_{max} 295 nm ($E_{1cm}^{1\%} = 380$) (in neutral aqueous solution); λ_{max} 235 nm ($E_{1cm}^{1\%} = 500$) and 305 nm ($E_{1cm}^{1\%} = 260$) (in 0.1 N

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NaOH solution). It is highly inhibitory against pathogen Xanthomonas oryzae and moderately so against Piricularia oryzae and Mycobacterium sp. 607.

According to its physical and chemical properties as well as biological characteristics, antibiotic 4-215 is identical to Formycin.

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TITLE: "A Study on the Large-Scale Preparation of HBsAg by Density-Gradient Zonal Centrifugation"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 1, 1980 pp 100-107

TEXT OF ENGLISH ABSTRACT: In the literature, the usual methods for large-scale preparation of pure HBsAg involved two cycles of cesium chloride isopycnic banding and one cycle of sucrose rate zonal sedimentation. In our hands, however, this seemed inadequate because the HBsAg obtained usually contained traces of normal human serum proteins. A composite purification procedure has been worked out in our laboratory. It consists of pepsin digestion, DEAE-cellulose chromatography, floating type of cesium chloride zonal centrifugation and sucrose rate zonal centrifugation. It can give pure HBsAg with buoyant densities ranging from 1.19 to 1.23 g/cm³ in cesium chloride gradient and from 1.15 to 1.16 g/cm³ in sucrose gradient. Normal human serum proteins were undetectable in the purified HBsAg and three to four immunizations to guinea pigs and horses gave rise to monospecific

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anti-HBs sera. These verified its high purity. Electron microscopic studies revealed a monodispersed small spherical particle without detectable Dane particles or filaments.

Now, large quantities of HBsAg are produced by this composite procedure in our laboratory for the purpose of making an experimental Hepatitis B vaccine.

AUTHOR: None

ORG: None

TITLE: "Two Regulations of the China Committee for Culture Collections of Microorganisms"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 1, 1980 pp 108-112

TEXT OF ENGLISH ABSTRACT: The first conference of Culture Collection was convened by the National Sciences and Technological Commission of China and the Chinese Academy of Sciences in Beijing on 11-18 July 1979. One hundred fifty representatives from the Ministry of Agriculture, Ministry of Light Industry, Ministry of Health, Ministry of Education, Ministry of Commerce, Ministry of Forestry, Pharmaceutics Administrative Bureau and Chinese Academy of Sciences attended the meeting. Due to the understanding of the country-wide importance of culture collections, the China Committee for Culture Collections of Microorganisms (CCCCM) was established. "The Organization Regulation of the China Committee for Culture Collections of Microorganisms" and "The Administrative Regulation of the China Culture Collections of Microorganisms" were enacted.

These two documents have been ratified by the National Sciences and Technological Commission of the People's Republic of China. These two regulations are of legislative value and will be enacted in Culture Collections for a long time.

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The organization regulation contains eight articles--name of organization, constitution of the committee, function and task of the committee, organizing system (centers for specialized culture collections), staffs and finance, conference, administrative regulation enactment, ratification and execution of the regulation.

The administrative regulation defines the following items: collection, preservation, nomenclature and catalogue, distribution and exchange, etc.

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TITLE: "Studies on Aphicidin. I. Identification of the Producing Streptomycete"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20
No 2, 1980 pp 113-115

TEXT OF ENGLISH ABSTRACT: In the course of screening for new antibiotic insecti-
cides, a strain of Streptomyces 26 was isolated from a soil sample collected from
the Tianmu Mountains in Zhejiang Province in 1972. Streptomyces strain 26 was
found to produce aphicidin, a new insecticide substance. The biological character-
istics of this strain were examined, and it was found that the strain was similar
to Streptomyces griseolus (Waksman, 1923), except for certain physiological and
biochemical reactions. It is, therefore, considered to be a new variety of
Streptomyces griseolus and is designated as Streptomyces griseolus var. hang-
zhouensis n. var. Yan et Fang 1978.

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TITLE: "Records on Some Species of Genus Prathigada and Stenella"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20
No 2, 1980 pp 116-121

TEXT OF ENGLISH ABSTRACT: This report records two spp. of genus Prathigada and
two spp. of genus Stenella in China. Among them, Prathigada crataevae (Syd.)
Subram. is a new record; Prathigada picrismae (Togashi et Katsuki) Liu et Liao,
a new combination; and Stenella caryotae Liu et Liao, a new species.

Detailed descriptions and figures for each species, as well as Latin diagnosis for
the new species, are given in the report. The type specimen is deposited in the
herbarium of the Institute of Microbiology, Chinese Academy of Sciences, Beijing.

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TITLE: "A New Species of Erysiphaceae"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20
No 2, 1980 pp 122-123

TEXT OF ENGLISH ABSTRACT: A new species of powdery mildew fungi collected from Yaan, Sichuan, is described, and named Phyllactinia desmodii Tao, Qin et Shen sp. nov. The present species is closely related to Ph. caesalpiniae (on Caesalpinia sepiaria Roxb.), but the size of the perithecium of Ph. desmodii was found to be much larger than that of Ph. caesalpiniae. Latin and Chinese diagnoses for the new species are given.

Type specimen of the new species is deposited in Sichuan Agricultural College, Yaan, Sichuan, China.

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TITLE: "A New Species of the Genus Phallus"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20
No 2, 1980 pp 124-126

TEXT OF ENGLISH ABSTRACT: A new phalloid fungus is described and denominated Phallus macrosporus. It differs from the known species of the genus Phallus L. ex Pers. in having larger (6 - 7.6 x 4 - 4.7 μ m) spores. Type specimen is deposited in the herbarium of the Department of Biology, Shanxi University, Taiyuan City, Shanxi Province.

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TITLE: "Studies on Cytochrome C of Ashbya gossypii--Purification, Crystallization and Comparison of Its Specificity"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 2, 1980 pp 127-133

TEXT OF ENGLISH ABSTRACT: Cytochrome C of Ashbya gossypii was isolated from the mycelia by either NaCl extraction or the ethyl acetate autolysis method. It had been purified and crystallized through repeated cation exchange on Zerolit 226 and ammonium sulfate fractionation.

The purified pigment was shown to be homogeneous on starch gel electrophoresis. Both the cytochrome C isolated by NaCl extraction and ethyl acetate autolysis had the same electrophoretic behavior, but the biological activity of cytochrome C isolated by the former method was much higher than that by the latter one.

The absorption spectra of oxidized cytochrome C had peaks at 409, 420-430 nm and the reduced form had the major peaks at 415.5, 521 and 550 nm. The pyridine

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hemochromogen absorption spectra had peaks at 414.5, 520 and 550 nm. The above spectral characteristics of cytochrome demonstrated that the pigment belonged to the C-type of cytochrome.

Crystalline cytochrome C of A. gossypii was found to contain 0.438 percent iron. The minimal molecular weight thus calculated was 12,800.

Cytochrome C preparation from six different sources was compared on the basis of its reactivity with cytochrome oxidase and succinoxidase of heart muscle preparation and A. gossypii mitochondrial fraction. It was observed that both the cytochrome oxidase of the heart muscle preparation and A. gossypii mitochondrial fraction had similar specificities to the six preparations. The relative activities in decreasing order were as follows: A. gossypii cytochrome C (NaCl extraction) > A. gossypii cytochrome C (ethyl acetate autolysis) > yeast cytochrome C > heart muscle cytochrome C fraction I > heart muscle cytochrome C fraction II > Pseudomonas fluorescens cytochrome C-551. The succinoxidase of heart muscle preparation and A. gossypii mitochondrial fraction also exhibited similar specificities to the six preparations, but the order of their relative activities was as follows: yeast cytochrome C > A. gossypii cytochrome C (NaCl extraction) > A. gossypii cytochrome C (ethyl acetate autolysis) > heart muscle cytochrome C fraction I > heart muscle cytochrome C fraction II > Pseudomonas fluorescens cytochrome C-551.

Based on these results, the specificity of A. gossypii cytochrome C was discussed.

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TITLE: "The Construction and Identification of Clones of Bacteriophage T₄ DNA Ligase Gene (G30) Fragments"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 2, 1980 pp 134-136

TEXT OF ENGLISH ABSTRACT: Over 5,000 clones of bacteriophage T₄ genes were constructed by EcoRI or Hind III partial digestion, then ligation to pBR322 and transformation of *E. coli* KH802. Using the marker rescue test, two clones which contain T₄ G 30 fragments were obtained, one of them (pAM3158) presumably carrying a complete G 30 fragment. It has been shown by agarose gel electrophoresis that the molecular weight of hybrid plasmid (pAM3158) is higher than that of pBR322, and after digestion by Hind III a clear new band appeared.

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TITLE: "Segments Shorter than Virion RNA Produced During In Vitro Transcription of Tobacco Mosaic Virus RNA"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 2, 1980 pp 137-143

TEXT OF ENGLISH ABSTRACT: TMV-specific double-stranded RNAs (RF and RI) synthesized in vivo can be separated into intact TMV-RNA at the selected thermal denaturation conditions of 98°C, 45 seconds, whereas at the same conditions, the viral double-stranded RNAs (showing the same apparent molecular weights as RF and RI) synthesized in vitro can only produce 8 to 10 RNA segments shorter than the virion RNA. The sizes of several of these segments are just like those of the RNAs isolated by Beachy and Zaitlin (1977) from short particles in TMV preparations. The hypothesis that these RNA segments synthesized in partial transcription might be used as TMV-specific mRNAs is discussed.

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TITLE: "Some Physical and Chemical Properties of Coliphage C2"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20
No 2, 1980 pp 144-149

TEXT OF ENGLISH ABSTRACT: The RNA phage C2 isolated from sewage in Beijing is identified as a polyhedron about 22 nm in diameter, with a sedimentation coefficient of 79S in SSC buffer and a specific absorbance of 7.8/mg/ml at 260 nm. Base composition analysis of the phage nucleic acid reveals that the molar ratios of adenine, uracil, guanine and cytosine are 22.0, 24.8, 26.1 and 27.0 respectively. The melting temperature of its RNA is 57.5°C, and the molecular weight is 1.1×10^6 as determined by polyacrylamide gel electrophoresis. The molecular weights of coat protein and A-protein determined by SDS-polyacrylamide gel electrophoresis are 13,200 and 42,000 respectively.

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TITLE: "Studies on the Selection and Cultivation of Ribonuclease N₁-High Producing Strain of Neurospora crassa"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20
No 2, 1980 pp 150-156

TEXT OF ENGLISH ABSTRACT: The selection and cultivation of ribonuclease N₁-high producing strain of Neurospora crassa as well as the identification of its ribonuclease is introduced in this paper.

(1) When the initial strain, N. crassa 3.1602 (ornithineless), was treated by 1/5000 triethylene tetramine at 28°C for two hours, and followed by treatment with γ -ray irradiation delivered by ⁶⁰Co at a dose rate of 13.2 Kr for four minutes (total dose, 52.8 Kr), a double auxotrophic strain, ornithineless and adenineless OA047 was derived. N. crassa strain WA011 was obtained from initial strain, 3.1604 (wild-type), by the treatment with 100 μ M N-methyl-N'-nitro-N-nitrosoguanidine at 28°C for two hours.

(2) N. crassa strain OA047 was grown in shaking flasks containing 5 percent wheat bran at 28-30°C for 72 hours, and the activity of ribonuclease in the culture filtrate was 114.5 units/ml. The activity of ribonuclease in the culture filtrate of N. crassa strain WA011 also reached about 100 units/ml after it was grown in

shaking flasks containing 5 percent soybean powder at 28-30° for 72 hours. The productivity of ribonuclease of both strains, under cultural conditions as described above, was successfully increased 100 times as compared with that of its initial strains growing in modified Frie's medium.

(3) Crude extract of *N. crassa* strain OA047 does not contain enzymic activities of phosphomonoesterase, and phosphodiesterase ribonuclease in crude extract is very stable. After it was heated at 80° for two minutes at pH 1.5-2.0, its activity was almost fully retained. Ribonuclease in the culture filtrate of *N. crassa* OA047 was identified as ribonuclease N_1 by the estimation of 3'-terminal residue of digestion products of yeast RNA, of its hydrolyzation of homopolynucleotides (Poly I, Poly C, Poly A and Poly I: C) and its hydrolase activity for 2', 3'-cyclic guanylic acid.

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TITLE: "Regulation of Glycolysis and Purine Nucleotide Metabolism in the Enzymatic Phosphorylation System of *Mucor aromaticus* Povah"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 2, 1980 pp 157-165

TEXT OF ENGLISH ABSTRACT: We have studied the character of glycolysis, the effects of glucose and phosphate upon glycolysis and regulation of purine nucleotide metabolism of *M. aromaticus*. Although *M. aromaticus* possesses strong fermenting power, the phosphorylation of glucose in *M. aromaticus* is easily effected by the temperature of storage of the mycelia. That may be the key factor affecting glycolysis and phosphorylation of AMP of *M. aromaticus* here.

In the reaction system of enzymatic phosphorylation of *M. aromaticus*, not only the phosphorylation efficiency of AMP but also the accumulation rate of ATP was affected by the concentration of glucose, and the molar ratio of glucose to phosphate (G/P) played an important role in regulating the activation of the enzyme system of glycolysis and purine nucleotide metabolism. The degradation of AMP was inhibited

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as $G/P < 1$. The deamination of AMP brought forth the IMP, and the decomposition of the latter brought forth Ino and/or Hx as $G/P > 1$. Under certain concentrations of glucose, the high concentration of phosphate could inhibit deamination of AMP and decomposition of IMP, and promote phosphorylation of AMP. It seems that under certain concentrations of phosphate, the inhibition effect of the phosphate on the activity of AMP deaminase and Ino hydrolase can be eliminated when $G/P > 1$, with AMP deaminated to form IMP, and the latter further decomposed to Hx. Therefore, G/P plays an important regulative role in the metabolic pathway of the purine nucleotide of M. aromaticus.

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TITLE: "The Parametric Analysis on Microbial Strains"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 2, 1980 pp 166-172

TEXT OF ENGLISH ABSTRACT: The microbiological explanation of the basic parameters for the productive distribution of strains, and the conceptions of the divergent effects and the convergent effects of the mutagens are given in this paper. The following empirical equations: $A = \bar{X}(Ct/6)^{1/6}(1 + Cs/8)^{1/2}$ (called productive capacity) and $B = \bar{X}(6Ct-1)^{1/6}(1 + Cs/8)^{1/2}$ (called variate capacity), were obtained from the microbial breeding practice in China. The statistical method used to estimate the productive strains, the mutagens and technology of production are given in this paper.

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TITLE: "Studies on the Application of the Reversed Passive Carbon Agglutination Test to the Detection of Viruliferous Individuals of Rice Dwarf Virus"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 2, 1980 pp 173-179

TEXT OF ENGLISH ABSTRACT: This paper deals with the method of preparation of the rice dwarf virus (RDV) carbon antiserum and its use for detection of viruliferous insects and hosts.

The experimental results indicated that the antiserum must be hydrolyzed into fractions [$F(ab_2)'$] if the preparation of the RDV carbon antibody is made with pure chemical active carbon as carrier. It was better when the $F(ab_2)'$ concentration was diluted about 1 mg/ml in 0.1 M phosphate buffer at pH 7.2, and was combined with carbon by grinding at the temperature of 22-30°C for 30 minutes.

This carbon antibody, namely the reversed passive carbon agglutination (RPCA), was

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highly specified and very sensitive. It showed marked agglutination reaction with immune agent of RDV and sap in 1 g of diseased plant and a single viruliferous insect, but it had a negative response to the healthy rice sap rice stripe virus, rice yellow stunt virus and rice yellow dwarf.

It is checked with biological inoculation (BI), and 610 transovarial insects were detected for RDV by RPCA techniques. The average coincidence rate was 83.9 ± 8.5 percent. The RDV positive rate by RPCA techniques was 32.8 percent, whereas by BI techniques it was 31.5 percent. In addition, 1082 field insects were detected, the average coincidence rate being 98.1 ± 0.09 percent. The RDV positive rate by RPCA techniques was 2.22 percent, and the RDV positive rate by BI techniques was 0.56 percent.

The experimental results showed that those by RPCA techniques and BI techniques were close, and therefore the RPCA techniques would be useful practically in production.

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TITLE: "A Survey of Hydrogen Evolution from Leguminous Root Nodules"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 2, 1980 pp 180-184

TEXT OF ENGLISH ABSTRACT: A survey of H_2 -evolution of nodulated root systems of broad beans, peas, vetch, astragalus, hairy vetch, soybeans and peanuts grown in field conditions was carried out. It showed that all samples analyzed released H_2 to different extents. The mean relative efficiency of energy utilization for nitrogen fixation was 0.754, or approximately 25 percent of the energy was wasted in H_2 -evolution.

Among nearly 200 strains of rhizobia tested, several non- H_2 -releasing strains (i.e., the relative efficiency > 0.95) were found, among them being soybean rhizobial strains 182-2 and 113-2 and peanut strain 97-1. None of the astragalus

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rhizobial strains tested were non- H_2 -releasing strains.

A comparison between non- H_2 -releasing strains and H_2 -releasing strains, and statistical analysis of three sets of experimental data (including a set of Schubert and Evans data) have shown that dry matter accumulation of soybean-rhizobia symbiotic system is highly correlated with nitrogenase activity, while the effect of H_2 -evolution on dry matter accumulation is of minor importance.

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TITLE: "The Microbial Dehydrogenation of Ring-A Saturated Steroids. I. Preparation of Dehydro-17 α -Methyl-Testosterone from 17 α -Methyl-Androstane-3 β , 17 β -Diol"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 2, 1980 pp 185-190

TEXT OF ENGLISH ABSTRACT: In this study, the dehydrogenation abilities of 62 strains of microorganisms (belonging to the genera *Nocardia* and *Arthrobacter*) on 17 α -methyl-5 α -androstane-3 β , 17 β -diol (I) and 17 α -methyl-testosterone (III) were compared. Results showed that on the basis of the characteristics of dehydrogenation in these microorganisms, four patterns of microbial transformation were identified:

- (1) I \rightarrow III \rightarrow IV
- (2) I \rightarrow III \rightarrow IV
- (3) I \rightarrow III \rightarrow IV
- (4) I \rightarrow III \rightarrow IV.

An *Arthrobacter* 9-2 strain which can oxidize (I) completely was selected from the

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second pattern of microbial transformation. Addition of CoSO_4 in its cultural medium inhibited the degradation of dehydro-17 α -methyl-testosterone (IV), so that the product accumulated greatly.

The optimal pH of dehydrogenation was about 6, and the optimal concentration of ethanol used to dissolve the substrate was 2 percent. Under these conditions, the transformation rate of the dehydro-17 α -methyl-testosterone (IV) was over 85 percent.

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TITLE: "Purification and Identification of Jingsimycin"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 2, 1980 pp 191-195

TEXT OF ENGLISH ABSTRACT: Streptomyces hygroscopicus var. jinggangensis Yan is closely related to Streptomyces hygroscopicus var. limoneus. In addition to jinggang-mycin, it produces an antifungal antibiotic Jingsimycin which was proved to be similar to Saramycin both in physicochemical and biological properties. The hydrolysate gave eight spots on paper chromatography. Five of them were identified as cysteine, aspartic acid, glycine, threonine and proline.

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TITLE: "Cytopathic Effect of Tick-Borne Encephalitis Virus in Chick Embryo Cells and Its Application"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 2, 1980 pp 196-202

TEXT OF ENGLISH ABSTRACT: Some strains of tick-borne encephalitis virus exerted a marked cytopathogenic effect on fibroblast cell cultures prepared from the skin-muscle tissue of chick embryo. The specificity of the CPE was confirmed by the neutralization test with homologous immune serum. The CPE of the virus and its propagation were evident in each passage.

The cytopathogenic titers in monolayer cell cultures varied from 7.0 to 9.0 log TCID₅₀, corresponding approximately to the virus titer estimated in mice.

A simple and sensitive neutralization test for tick-borne encephalitis virus in chick embryo monolayer cell cultures was elaborated. Based on these results this

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method might be applied in the diagnosis and serological survey of tick-borne encephalitis.

The role of the above-mentioned factors which influenced the cytopathogenicity of the tick-borne encephalitis virus was discussed.

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TITLE: "Studies on the Vaccination of Rhesus Monkeys against Plasmodium knowlesi Malaria by the Use of Non-Soluble Antigen Fractions"

SOURCE: Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 20 No 2, 1980 pp 203-207

TEXT OF ENGLISH ABSTRACT: This is a report of a successful immunization of monkeys against Plasmodium knowlesi malaria by the use of insoluble antigen fraction without adjuvant.

1. The antigens are prepared according to a previous paper (Li et al., 1974). Parasites are harvested from infected monkeys' blood at peak parasitemia with mature schizont using a 1% saponin solution in 0.9% saline. The pooled parasites are suspended in four volumes of 5mM MgCl₂ solution, and homogenized with a universal homogenizer at 18,000 rpm for 15 minutes. The resulting suspension was centrifuged to fractionate various antigen components. The pellet, sedimented with centrifugation at 10,000 g for 30 minutes, is designated as antigen fraction II. The supernatant was recentrifuged at 105,000 g for 60 minutes, the resulting pellet

being designated as antigen fraction I.

2. All antigen fractions are diluted with a volume of 0.9% saline and no adjuvants are added. The suspensions of these two fractions are used directly in vaccination.

3. Fifteen monkeys (*Macaca mulatta*) used in this experiment were divided into groups I, II and III (control), having five monkeys each. 2-3 ml of vaccine antigens were injected intramuscularly three times to each animal of the two immunized groups, group I with fraction I and group II with fraction II. Ten days later all experimental monkeys were challenged with intravenous inoculation of 11×10^3 erythrocytes infected with homologous parasites.

4. In group I, four of the five monkeys survived and three of the surviving animals did not develop parasitemia, showing the greatest protection. The protection of antigen fraction II was poor, with only one of the five vaccinated monkeys surviving while the others developed high-grade parasitemia and finally died. All five control monkeys developed lethal infections.

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